


PATENT COOPERATION TREATY
PCT
INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PCT-5019	FOR FURTHER ACTION		See Form PCT/PEA/416
International application No. PCT/EP2004/010944	International filing date (<i>day/month/year</i>) 29.09.2004	Priority date (<i>day/month/year</i>) 01.10.2003	
International Patent Classification (IPC) or national classification and IPC B21D51/54, B21K1/04, F42B5/26			
Applicant GIOBBE S.R.L. et al.			
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 7 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p style="margin-left: 20px;">a. <input checked="" type="checkbox"/> <i>sent to the applicant and to the International Bureau</i>) a total of 12 sheets, as follows:</p> <p style="margin-left: 40px;"><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p style="margin-left: 40px;"><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p style="margin-left: 20px;">b. <input type="checkbox"/> (<i>sent to the International Bureau only</i>) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>			
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input checked="" type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application</p>			
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ON PATENTABILITYInternational application No.
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Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language, which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages

1-12 as originally filed

Claims, Numbers

1-71 filed with telefax on 09.11.2005

Drawings, Sheets

1/4-4/4 as originally filed

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

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Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-71
	No: Claims	
Inventive step (IS)	Yes: Claims	1-71
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-71
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

Claims 1 and 25

Claim 1 relates to a die set for forming cartridge cases comprising at least 3 support elements comprising an upper element, a middle element and a bottom element connected together in the longitudinal direction, according to the characterizing portion of claim 1.

The subject-matter of claim 1 differs from the die set disclosed in document CH-A-178 286 (D1), which represents the closest prior art, in that:

- the support elements are connected together in the longitudinal direction by guide columns (D1 does not explicitly disclose the connection means provided), and in that
- the fixed middle element comprises means for shearing and means for forming (a drawing punch: see point VIII of this Report) the case (from a sheet of metal: see point VIII of this Report) able to co-operate with corresponding locating means associated with the bottom support element.

Claim 25 relates to a machine comprising such a die set and defines corresponding distinguishing technical features.

Claim 1 and 25 are thus novel and as such they meet the requirements of Art. 33(2) PCT.

The problem to be solved has to be seen in providing a simple and low-cost die set and machine for forming a cartridge cases from a sheet metal which allow a more rapid cycle time and graphically printing of the case before forming.

The solution to this problem proposed in claims 1 and 25 of the present application, clarified as specified under point VIII of this Report, is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

Document D1 discloses a die set and a machine equipped with such a die suitable for forming a case starting from a tubular blank whereby this forming means are not meant for forming a case from a sheet metal. Moreover no shearing means are provided, which according to the present application, in combination with the forming means achieves forming of the cartridge case from a sheet metal.

Document US-A-2 079 102 (D2) discloses the same subject-matter as D1.

The other document are less relevant.

Therefore there is no lead in the available prior art leading in an obvious way to a die set and to a machine with such a die set according to claims 1 and 25.

Claim 50

Having regard to claim 47, its subject matter differs from document D1 in that:

- the cartridge case is formed starting from a metal sheet, and in that
- forming and boring the case is achieved in a single stage.

The subject-matter of claim 47 is therefore novel (Article 33(2) PCT).

The problem posed is the same as mentioned with respect to claims 1 and 25.

The solution to this problem proposed in method claim 47 of the present application, clarified as specified under point VIII of this Report, is considered as involving an inventive step (Article 33(3) PCT) because no document disclose or obviously suggest forming of the case starting from a metal sheet, whereby forming and boring is carried out in a single step. In particular both D1 and 2 teach forming of a case starting from a tubular blank, whereby no boring step is carried out. Moreover the case is not formed in a single step.

Dependent Claims

Claims 2 to 24, 26 to 49 and 51 to 71 are dependent on claims 1, 25 and 50 respectively and as such also meet the requirements of the PCT with respect to novelty and inventive step.

Amendments: claim 1 is a combination of claims 1, 2 and 3 as filed. Claim 25 is a combination of claims 27, 29 and 30 as filed. Claim 50 is a combination of claims 54 and 57 as filed.

Re Item VII

Certain defects in the international application

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the document D1 is not mentioned in the description, nor are these documents identified therein.

The description has not been brought in conformity with the claims.

Re Item VIII

Certain observations on the international application

Claims 1, 25 and 50 are not supported by the description as required by Article 6 PCT, as their scope is broader than justified by the description and drawings. The reasons therefor are the following:

In claim 1 and 25 it is not specified that the die set is suitable for forming the case starting from a sheet metal, and that the forming means comprises a drawing punch in conformity with all embodiments of the description and drawings. Having regard to claim 50 it should have included the shearing operation in combination with forming of the case according to all embodiments of the description and drawings.

Moreover the fact that the three support elements are an upper element, a middle element and a bottom element should have been presented as compulsory feature (without the expression "i.e.") in conformity with the remaining formulation of claims 1 and 25 (Art. 6 PCT).

Moreover claim 25 essentially comprises all the features of claim 1 and is therefore not

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appropriately formulated as a claim dependent on the latter ("Machine for forming a case comprising a die set according to claim 1 ...") according to Rule 6.4 PCT.

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CLAIMS

1. Die set for forming cartridge cases (1;101), comprising at least three support elements, i.e. an upper element (1100), middle element (1200) and bottom element (1300), characterized in that they are
5 connected together in the longitudinal direction by guide columns (1001) along which said upper support (1100) and bottom support (1300) are actuated displaceably relative to each other in predefined
10 working sequences, in that said upper support element (1100) and bottom support element (1300) are movable relative to the fixed middle element (1200) and in that said middle support element (1200) comprises means (1230) for shearing and means (1240) for forming the
15 case (1;100) able to co-operate with corresponding locating means (1330,1340) associated with said bottom support element (1300).

2. Die set according to Claim 1, characterized in
20 that said means (1230) for shearing and means (1240) for forming the case (1;101) comprise a sleeve (1210) extending in the axial direction and constrained to the middle support element by means of internally threaded elements (1211) suitable for mating with the threaded
25 opposite ends (1210a) of the said sleeve.

3. Die set according to Claim 1, characterized in that said means (1230) for shearing and means (1240) for forming the case (1;101) comprise a blanking punch
30 (1230) arranged inside the sleeve (1210) and coaxially arranged so as to extend outside the side of the middle support element (1200) directed towards the bottom element (1300).

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4. Die set according to Claim 3, characterized in that the opposite ends of said blanking punch (1230) are respectively locked inside said sleeve (1210) and axially project towards the outside of the middle support element.

5. Die set according to Claim 2, characterized in that said sleeve (1210) has, arranged coaxially inside it, a containing bush (1220) housing internally an adjustable-load spring (1221), the opposite ends of which bear respectively against a closing element (1222) and against the said blanking punch (1230).

6. Die set according to Claim 1, characterized in that said forming means comprise a drawing punch (1240) integral with one end of a rod (1241), the opposite end of which is integrally fixed to the upper support element (1100) with the arrangement of a spring (1243) in between.

7. Die set according to Claim 6, characterized in that said rod (1241) has passing through it axially a duct (1242) for supplying air to the drawing punch (1240).

8. Die according to Claim 6, characterized in that said rod (1241) passes coaxially through the closing element (1222) and the spring (1221).

9. Die set according to Claim 6, characterized in that the end part of the drawing punch (1240) directed towards the top part of the die set has a seat (1245a) able to contain a shearing ring (1245).

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10. Die set according to Claim 6, characterized in that the end part of the blanking punch (1240) has an axial seat (1241) able to contain the boring pin (1353).

5

11. Die set according to Claim 1, characterized in that the bottom support element (1300) has, inserted inside it, a shearing die (1330).

10

12. Die set according to Claim 11, characterized in that the bottom support element (1300) has, inserted inside it, a drawing die (1340) coaxial with said shearing die (1330).

15

13. Die set according to Claim 1, characterized in that the bottom support element (1300) has, inserted inside it, an extractor (1360).

20

14. Die set according to Claim 1, characterized in that the bottom support element (1300) has, inserted inside it, a boring punch (1350).

25

15. Die set according to Claim 11, characterized in that the shearing die (1330) is axially fixed to the bottom support element (1300).

30

16. Die set according to Claim 12, characterized in that the drawing die (1340) is axially fixed to the bottom support element (1300).

17. Die set according to Claim 14, characterized in that the boring punch (1350) is axially fixed to the bottom support element (1300).

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18 Die set according to Claim 13, characterized in that said extractor (1360) comprises a cup member (1361) movable axially against the thrusting action of spring means (1362).

5

19. Die set according to Claim 17, characterized in that said cup member (1361) has a coaxial opening (1361a) able to allow means (1350) for boring the case (1;101) to pass through.

10

20. Die set according to Claim 14, characterized in that said boring punch (1350) comprises a tip (1353) integral with the top end of a column (1352).

15

21. Die set according to Claim 21, characterized in that the boring punch (1352) comprises an annular surface (1370) arranged coaxially with the said punch and at a suitable axial distance from the boring tip (1353), the said annular surface being provided with reliefs (1371,1372) for engraving the bottom of the case (1;101).

20

22. Die set according to Claim 21, characterized in that the forming punch (1240) envisages a free surface for making contact with the disk (10), associated with a surface (1270) on which recesses (1271,1272) corresponding to the reliefs (1371,1372) on the annular engraving surface (1370) are formed.

25

23. Die set according to Claim 1, characterized in that it comprises an element (1310) for axially closing the seat housing the said boring means (1350).

30

24. Die set according to Claim 1, characterized in

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that said case (101) has a surface graphically pre-printed in one or more colours.

25. Machine for forming a case (1;101), comprising a
5 die set comprising at least three support elements,
i.e. upper element (1100), middle element (1200) and
bottom element (1300), characterized in that they are
connected together in the longitudinal direction by
10 guide columns (1001) and/or by sliding surfaces along
which said upper support element (1100), middle support
element (1200) and bottom support element (1300) are
actuated displaceably relative to each other in
predefined working sequences, in that said middle
15 support element (1200) is fixed and in that said middle
support element (1200) comprises shearing means (1230)
and means (1240) for forming the case (1;101), able to
co-operate with corresponding means (1330,1340)
associated with said bottom support element (1300).

20 26. Machine according to Claim 25, characterized in
that it is a press.

27. Machine according to Claim 25, characterized in
that said shearing means (1230) and means (1240) for
25 forming the case (1;101) comprise a sleeve (1210)
extending in the axial direction and constrained to the
middle support element by means of internally threaded
elements (1211) suitable for mating with the threaded
opposite ends (1210a) of the said sleeve.

30 28. Machine according to Claim 25, characterized in
that said means (1230) for shearing and means (1240)
for forming the case (1;101) comprise a blanking punch
(1230) arranged inside the sleeve (1210) and coaxially

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arranged so as to extend outside the side of the middle support element (1200) directed towards the bottom element (1300).

5 29. Machine according to Claim 27, characterized in that the opposite ends of said blanking punch (1230) are respectively locked inside said sleeve (1210) and axially project towards the outside of the middle support element.

10

30. Machine according to Claim 26, characterized in that said sleeve (1210) has, arranged coaxially inside it, a containing bush (1220) housing internally an spring (1221), the opposite ends of which bear
15 respectively against a closing element (1222) and against said blanking punch (1230).

31. Machine according to Claim 25, characterized in that said forming means comprise a drawing punch (1240)
20 integral with one end of a rod (1241), the opposite end of which is integrally joined to the upper support element (1100) with the arrangement of a spring (1243) in between.

25 32. Machine according to Claim 30, characterized in that said rod (1241) has passing through it axially a duct (1242) for supplying air to the drawing punch (1240).

30 33. Machine according to Claim 30, characterized in that said rod (1241) passes coaxially through the closing element (1222) and the spring (1221).

34. Machine according to Claim 30, characterized in
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that the end part of the drawing punch (1240) directed towards the inside of the middle support element (1200) has a seat (1245a) able to contain a shearing ring (1245).

5

35. Machine according to Claim 30, characterized in that the end part of the drawing punch (1240) directed towards the upper support of the die set has a seat (1241) able to contain the tip (1353) of the boring
10 punch (1352).

36. Machine according to Claim 25, characterized in that the bottom support element (1300) has, inserted inside it, a shearing die (1330).

15

37. Machine according to Claim 25, characterized in that the bottom support element (1300) has, inserted inside it, a drawing die (1340) coaxial with said shearing die (1330).

20

38. Machine according to Claim 25, characterized in that the bottom support element (1300) has, inserted inside it, an extractor.

25

39. Machine according to Claim 25, characterized in that the bottom support element (1300) has, inserted inside it, a boring punch (1350).

30

40. Machine according to Claim 35, characterized in that the shearing die (1330) is axially fixed to the bottom support element (1300).

41. Machine according to Claim 36, characterized in that the drawing die (1340) is axially fixed to the

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bottom support element (1300).

42 Machine according to Claim 39, characterized in
that the boring punch (1350) is axially fixed to the
5 bottom support element (1300).

43. Machine according to Claim 37, characterized in
that said extractor (1360) is formed by a cup member
(1361) movable axially against the thrusting action of
10 spring means (1362).

44. Machine according to Claim 42, characterized in
that said cup member (1361) has an opening (1361a)
allowing means for boring the bottom of the case
15 (1;101) to pass through.

45. Machine according to Claim 38, characterized in
that said boring punch (1350) comprises a tip (1353)
integral with the top end of a column (1352).

20 46. Machine according to Claim 38, characterized in
that said boring punch (1352) comprises an annular
surface (1370) arranged coaxially with the said punch
and at a suitable axial distance from the boring tip
25 (1353), the said annular surface being provided with
reliefs (1371,1372) for engraving the bottom of the
case (1;101).

47. Machine according to Claim 46, characterized in
30 that the forming punch (1240) envisages a free surface
associated with a surface (1270) on which recesses
(1271,1272) corresponding to reliefs on the annular
engraving surface are formed.

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48. Machine according to Claim 25, characterized in that it comprises an element (1310) for axially closing the seat housing the said boring means (1350).

5 49. Machine according to Claim 25, characterized in that said case (101) has a pre-printed surface.

50. Method for forming a cartridge case (1; 101), characterized in that it comprises the following steps:

10 e) supplying a sheet of metal (10) to a forming machine (20);

f) forming and boring the case (1;101) in a single stage by three coaxial movements of a forming die set;

15 g) extraction of the formed and bored case (1;101).

51. Method according to Claim 50, characterized in that said metal sheet (10) is cut to a predefined size.

20 52. Method according to Claim 50, characterized in that said forming operation is a drawing operation.

53. Method according to Claim 50, characterized in that said forming and boring operations are performed.

25

54. Method according to Claim 50, characterized in that the case obtained (1;101) has a substantially constant thickness along the side surface and bottom.

30 55. Method according to Claim 50, characterized in that it comprises a further step for widening the bottom (1b) of the case (1;101).

56. Method according to Claim 50, characterized in
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that it comprises a further step for printing the bottom (1b) and/or the external side surface of the case (1;101).

5 57. Method according to Claim 56, characterized in that said further printing step is performed in-line.

10 58. Method according to Claim 56, characterized in that said further printing step consists in tampography, serigraphy or printing with an electronic pen.

59. Method according to Claim 50, characterized in that the material used for forming the case is steel.

15 60. Method according to Claim 59, characterized in that the said material is preferably steel lined electrolytically and/or suitable for combination with a film of metal such as brass, stainless steel, zinc, 20 aluminium, titanium, copper and/or plastic.

61. Method according to Claim 59, characterized in that said material is preferably steel lined with tin.

25 62. Method according to Claim 59, characterized in that the case (1;101) comprises a further step for painting the cut edges.

30 63. Method according to Claim 61, characterized in that said painting is performed by means of electrophoresis.

64. Method according to Claim 50, characterized in that said material is preferably aluminium and alloys
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thereof.

5 65. Method according to Claim 50, characterized in that it comprises the following steps) downstream of the step for cutting the sheet (10) and upstream of the step for forming the case (1;101):

b) lithographic printing of a surface of the sheet (10;

10 c) varnishing the printed sheet (10) with a layer of protective varnish;

d) polymerization of the print and the varnish.

15 66. Method according to Claim 65, characterized in that the protective varnish applied to the print is of the polyester, epoxy ureic, polyurethane, epoxide type containing zirconium or water.

20 67. Method according to Claim 65, characterized in that polymerization of the print and the varnish is performed using hot air.

25 68. Method according to Claim 67, characterized in that the temperature of the hot-air oven is kept between 180° and 220°C.

69. Method according to Claim 68, characterized in that the temperature of the hot-air oven is preferably kept between 195° and 205°C.

30 70. Method according to Claim 65, characterized in that polymerization of the print and the varnish is performed using UV rays.

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71. Method according to Claim 50 or 65, characterized in that it envisages a step involving engraving of the bottom of the case during boring thereof.

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